PERSISTENT ORGANIC POLLUTANTS

Perfluorinated Compounds May Lower Vaccine Protection in Children

Perfluorinated compounds (PFCs), commonly found in nonstick cookware, food packaging, and stain-repellant clothing and furniture, may lower the potency of childhood immunizations, according to a new study of residents in the Faroe Islands. Children with high blood levels of PFCs had lower antibody levels for diphtheria and tetanus than children with lower PFC levels. In some cases the antibody loads were likely too low to protect children against these infections.[1]

The study participants were part of a longitudinal birth cohort born in the Faroe Islands between 1997 and 2000. Researchers measured tetanus and diphtheria antibodies in 587 children at ages 5 and 7 years. The children had been vaccinated against these diseases in accordance with the standard Danish/Faroese vaccination schedule. The children's PFC exposure was estimated from blood samples provided by their mothers soon before delivery as well as blood samples provided by the children themselves at age 5 years (children can be exposed to PFC prenatally[2] and after birth[3]).

Both prenatal and childhood PFC exposures were associated with impaired antibody levels. At age 5, a doubling in prenatal levels of the PFC perfluorooctane sulfonate was linked to a 39% reduction in diphtheria antibodies. At age 7, a doubling in PFCs measured 2 years previously was associated with a 49% reduction in combined tetanus and diphtheria antibodies. A quarter of the 5-year-olds fell below the level of antibodies considered clinically protective for tetanus, and 37% were below the cutoff for diphtheria antibodies.[1] Children with low antibody levels were revaccinated to boost their protection, says study leader Philippe Grandjean, an adjunct professor of environmental health at the Harvard School of Public Health.

Although the study examined only two of the many vaccines children receive, the results suggest that PFCs may dampen the anticipated lifelong protection of more of these mainstays of modern disease prevention. Only a few other agents, such as pharmaceuticals[4] and ionizing radiation[5] used in cancer therapy, have been shown to interfere with childhood immunizations as strongly as PFCs appeared to in this study, Grandjean says. Studies in mice have shown that exposure to PFCs suppresses the immune system,[6] and the new results now connect these common environmental chemicals with immunotoxicity in humans. "We need to explore this in greater depth," Grandjean says.

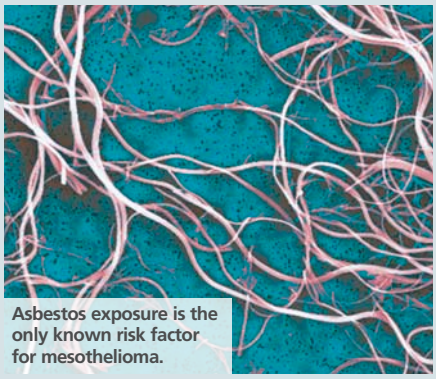
Studies of generally representative populations of U.S. women[7] and children[8] suggest these groups have roughly the same or slightly higher PFC levels, respectively, compared with their Faroese counterparts.[1] "The negative impact of PFCs on childhood vaccinations also should be viewed as a potential threat to public health in the United States," Grandjean says.

People tend to worry about gross adverse health effects of chemical exposures, such as cancer, points out Paige Lawrence, an associate professor of environmental medicine, microbiology, and immunology, and director of the Toxicology Training Program at the University of Rochester School of Medicine & Dentistry. "However, we overlook more subtle adverse effects, such as how

The Beat | by Erin E. Dooley

April 1–7 Is National Asbestos Awareness Week

In March 2012 the U.S. Senate for the second year in a row approved Resolution 389, declaring the first week of April to be National Asbestos Awareness Week.[1] Sponsored by Max Baucus (D–MT), the goal of the measure is to increase public awareness of the prevalence of asbestos-related diseases and the dangers of asbestos exposure. The National Toxicology Program declared asbestos a known human carcinogen decades ago.[2] The United States, which no longer mines asbestos but still imports it,[3] is one of the few industrialized nations where asbestos is not banned.



Asbestos exposure is the only known risk factor for mesothelioma.

Safe Drinking Water Target Met

With goal 7 of the Millennium Development Goals Declaration, the WHO and UNICEF pledged to halve the proportion of the world's population lacking access to safe drinking water and basic sanitation by 2015. In March 2012 the WHO announced that part of this goal had been met—and exceeded—with the provision of sustainable access to safe drinking water to 89% of the population.[4] Since 1990 more than 2 billion people have gained access to improved sources of drinking water, nearly half of them in China and India. More than three-quarters of a billion people still lack access to safe water.

Tobacco Smoke Exposure *in Utero* Linked to Eczema in Infants

Exposure to tobacco smoke *in utero* has been linked with the development of asthma and respiratory infections in infants. A new preliminary study of more than 1,400 infants, presented at the 2012 Annual Meeting of the American Academy of Allergy, Asthma & Immunology, finds it may also affect the development of the skin condition eczema.[5] Infants exposed during the third trimester were significantly more likely to develop eczema after birth, compared with unexposed babies. There were no increases for infants exposed during the first trimester or in the first 6 months following birth. Nationwide, an estimated 10% of children

Prenatal exposure to tobacco smoke may contribute to eczema.

What are perfluorinated compounds?

Perfluorinated compounds, or PFCs, are water- and grease-resistant industrial chemicals used in coatings for paper plates, food packaging, rainwear, upholstery, nonstick pans, microwave popcorn bags, and lubricants for skis and snowboards.[9,10,11] Two of the better known PFCs are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). People can ingest PFCs in food and water and inhale them in dust, although it is unknown which route(s) contribute the most to exposure.[12] To limit exposure, Grandjean recommends avoiding microwave popcorn, stain repellents for furniture and carpets, and clothing and household items treated with PFCs; such items are often labeled "stain-resistant," "nonstick," or "stick-resistant."

chemicals affect our ability to fight infections or modify how well vaccines work," she says.

Lawrence calls Grandjean's study "groundbreaking" because it highlights how little we know about how environmental chemicals such as PFCs perturb the immune system. "The immunotoxicity of these chemicals needs a lot more attention," she says.

Carol Potera, based in Montana, has written for *EHP* since 1996. She also writes for *Microbe*, *Genetic Engineering News*, and the *American Journal of Nursing*.

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under age 18 have been diagnosed with eczema.[6]

Federal Government Announces New E-Waste Policy

The U.S. General Services Administration has announced new guidelines[7] forbidding federal agencies from disposing of electronics equipment in landfills or incinerators. The guidelines ask federal agencies to continue to reuse electronics to the fullest extent possible before disposing of them at certified e-waste recycling facilities. Buyers of used government electronics will be encouraged to dispose of such products similarly. The guidelines align with sustainability goals set for the federal government by President Barack Obama.

Timing of Spring and Fall Affected by Urban Heat Islands

The urban heat island effect has been shown to influence the onset of spring and autumn in some areas, but not others. In a new study using 25 years of high-resolution satellite data, researchers observed later autumns and, to a lesser degree, earlier springs in forests within 35 km of Washington, DC, and Baltimore, Maryland, compared with forests farther away.[8] They report this is twice the distance observed in earlier studies using coarser-resolution data. Each year the slope of spring's transition time typically correlates with that of the fall that follows. The researchers hypothesize that changes in plant communities and soil moisture attributable to urban development may explain why urban heat islands impact autumn's timing more than spring's.

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The urban heat island effect can hasten the onset of spring.

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